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EXAMINER
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1 RECORD OF ORAL HEARING  
2  
3 UNITED STATES PATENT AND TRADEMARK OFFICE  
4

5  
6 BEFORE THE BOARD OF PATENT APPEALS  
7 AND INTERFERENCES  
8

9  
10 Ex parte HISASHI OHTANI and TORU MITSUKI  
11

12  
13 Appeal 2009-0328  
14 Application 09/379,702  
15 Technology Center 2800  
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17  
18 Oral Hearing Held: January 14, 2009  
19

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21  
22 Before KENNETH W. HAIRSTON, MAHSHID D. SAADAT, and KARL  
23 D. EASTHOM, Administrative Patent Judges  
24

25 ON BEHALF OF THE APPELLANTS:  
26

27 HUSSEIN AKHAVANNIK, ESQUIRE  
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31

32 The above-entitled matter came on for hearing on Tuesday, December  
33 9, 2008, commencing at 9:55 a.m., at The U.S. Patent and Trademark Office,  
34 600 Dulany Street, Alexandria, Virginia, before Lorie B. Allen.  
35  
36  
37

1 JUDGE HAIRSTON: Do you have a business card with you?

2 MR. AKHAVANNIK: No, I don't.

3 JUDGE HAIRSTON: Okay. Do you mind spelling your name for the  
4 record?

5 MR. AKHAVANNIK: Absolutely. It's Hussein, H-u-s-s-e-i-n; and  
6 my last name is, A-k-h-a-v-a-n-n-i-k.

7 JUDGE HAIRSTON: Thank you.

8 MR. AKHAVANNIK: You're welcome.

9 Good morning, Your Honors. My name is Hussein Akhavannik and I  
10 represent the appellant, Semiconductor Energy Laboratories.

11 The appellant has appealed the rejection of claims 45 through 64 over  
12 one of the appellant's own patents, Yamazaki, in view of Matsumoto.

13 Of these claims, claims 45 to 49 are independent. Each shares similar  
14 features.

15 In particular, the independent claims each recite that a semiconductor  
16 device includes a gate insulating film, including a first and second insulating  
17 film.

18 The first insulating film has a side aligned with a side of a crystalline  
19 semiconductor island and a second film extends beyond the first insulating  
20 film; and the reason I bring up those features is, the rest of the argument is  
21 directed towards that.

22 Therefore, all the independent claims require a gate insulating film  
23 having two insulating films with different horizontal dimensions. An  
24 example of such insulating film is shown in the application in figure 1-E  
25 wherein the first insulating film corresponds to reference number 104 and  
26 has at least one side aligned with the semi-conductor island 107. The second

1 insulating film, 109, is then put over the first insulating film and the  
2 semiconductor island. Neither Yamazaki, Matsumoto nor any proper  
3 combination of these references describe or suggest this feature.

4 As the Examiner's Answer acknowledges, Yamazaki only discusses  
5 one semi-insulating layer which is referred to by designation, designator  
6 three; if you look at figure 5-C, for example.

7 Therefore, the Examiner relies on Matsumoto for a second  
8 semiconductor and insulating layer.

9 If you look at figure one in Matsumoto, it discusses a matrix region  
10 which is towards the right-hand side of the page which has two separate  
11 insulating layers referred to by designation IDs 14 and 19, above a  
12 semi-conductor thin film eleven.

13 Column three of Matsumoto discloses that both of these insulating  
14 layers have the same horizontal dimensions which extends across the  
15 entirety of the substrate referred to by reference ID one.

16 JUDGE HAIRSTON: The insulator 14. It goes beyond the electrode  
17 26. But what in your claim precludes that from happening? Both the  
18 insulator 19 and the insulator 14 extend the whole length of the thin film.

19 MR. AKHAVANNIK: That's correct.

20 JUDGE HAIRSTON: Both of them have sides that are aligned with a  
21 side of a crystalline island. They just so happen to go beyond the island.  
22 The lower insulator 14 has sides aligned with the island but it also has sides  
23 that go beyond the island.

24 Your claim doesn't preclude the lower layer from having sides that  
25 align with the island and also having sides that go beyond the island.

1 MR. AKHAVANNIK: So, just to make sure I understand your  
2 question correctly, you're saying that a discrete portion of one of the layers  
3 14 and 19 could refer to a side of that insulating --

4 JUDGE HAIRSTON: I see the insulator being broken up by the  
5 electrode 26, the electrode going to the source and drain, 11-B. That island  
6 has a discrete section of insulating material under the gate, under the gate  
7 electrode. Fourteen is the discrete section of insulator under the gate  
8 electrode and it's aligned with a side of the crystalline semiconductor island;  
9 right?

10 MR. AKHAVANNIK: My understanding of this figure is that you  
11 view it in three dimensions and that the insulating layers are continuous.

12 JUDGE HAIRSTON: Right. Yes. That's what happens here in  
13 Matsumoto. Yes.

14 MR. AKHAVANNIK: So, there's not one side of insulating layers 14  
15 and 19 that is aligned given the cross sectional view shown in figure one.

16 JUDGE HAIRSTON: Mm-hum.

17 MR. AKHAVANNIK: It may be that there are different parts, for  
18 example the electrodes, that are placed in different portions of the  
19 semiconductor device but those insulating layers are continuously formed  
20 along the semi-conductor, substrate one.

21 JUDGE HAIRSTON: Okay. You're saying we only see part of the  
22 picture here. Okay. I understand.

23 JUDGE SAADAT: Are you talking about the direction perpendicular  
24 to the paper?

25 MR. AKHAVANNIK: Yes; that's correct.

1 JUDGE SAADAT: But in this, the cross-section that's shown on the  
2 cover of the reference -- the two insulating layers that are under the gate do  
3 both, go to the edge of the -- or at least align with the sides of the island  
4 where the two electrodes contact source and drain and also they go beyond;  
5 and the claim doesn't preclude that one should not go beyond.

6 MR. AKHAVANNIK: I believe that when you look at the claims in  
7 view of the specification, the side is disclosed. For example, in figure 1-E,  
8 when it says "a side," that means it's aligned with the semiconductor island.  
9 The semiconductor island and the insulating layer 104 are etched together to  
10 have the island shape, if you will.

11 So, given that the insulating layers 14 and 19 of Matsumoto extend  
12 along the entirety of the substrate, I don't believe that it's reasonable to say  
13 that they have a side that is aligned with one of the semiconductor islands or  
14 for example the gate electrode 20.

15 JUDGE EASTHOM: Can we compare figure 2-C and figure 2-D?  
16 Look at the electrodes, 11a and 11b; and then 14 is right over those. So,  
17 right where 14 in figure 2-D, 14 as an interior side that abuts up against the  
18 electrode 11b. So, that side on the inside of the layer is aligned with it.

19 MR. AKHAVANNIK: To make sure I'm understanding your  
20 question correctly, along the right side, starting from the right to the left of  
21 the figure in Matsumoto, the insulating layer 14 goes across, abuts 11b, that  
22 portion of the semiconductor thin film, and then extends beyond, above.

23 JUDGE EASTHOM: Right. Right where that abuts is where the side  
24 aligns, that inside of the wall aligns.

25 MR. AKHAVANNIK: And then the insulating layer 19 basically  
26 runs parallel to that, above it.

1 JUDGE EASTHOM: Right.

2 MR. AKHAVANNIK: Again, given that exact description, in such  
3 scenario, both 14 and 19 have the same dimension.

4 JUDGE EASTHOM: But your claim doesn't preclude that.

5 MR. AKHAVANNIK: Doesn't preclude them from having the same  
6 dimension?

7 JUDGE EASTHOM: Does it? Maybe I missed it.

8 MR. AKHAVANNIK: You can look at, for example, claim 45. It  
9 discusses the structure of the semiconductor device --

10 JUDGE EASTHOM: I'm looking for the word "dimension,"  
11 "different dimension."

12 MR. AKHAVANNIK: Well, the final element says that the second  
13 insulating layer extends beyond an edge of the first insulating layer.

14 JUDGE EASTHOM: It does; but it doesn't say the first one doesn't.  
15 The first one, as both the Judges have said, can also extend beyond.

16 JUDGE SAADAT: What it means is the layer is just broken up, for  
17 example, by the contact so it creates a portion in the middle that is aligned  
18 with the edge of the island and also beyond the contact. It includes portions  
19 that go beyond the edge of the island. That's the interpretation we get from  
20 it.

21 MR. AKHAVANNIK: But on such an interpretation, if I'm  
22 understanding correctly, the insulating layer 14 is what you're referring to  
23 being both the first and the second insulating film.

24 JUDGE EASTHOM: No.

25 JUDGE SAADAT: No. No, no.

1 JUDGE HAIRSTON: Fourteen is the first insulating film in  
2 Matsumoto and 19 would be the second insulating film.

3 MR. AKHAVANNIK: But because 14 is continuous beyond --

4 JUDGE HAIRSTON: What we're saying is, your claim doesn't  
5 preclude it from continuing on.

6 MR. AKHAVANNIK: I would say that when you have an edge of  
7 something --

8 JUDGE HAIRSTON: But we found an edge. All claim 45 says is to  
9 find that side aligned with a side of the crystalline semiconductor island.  
10 Fourteen has that. It goes on and continues on beyond the island; but the  
11 claim doesn't preclude the insulator 14 from going beyond the island.

12 Also, I see your name is not on the brief and reply brief.

13 MR. AKHAVANNIK: I have associate power of attorney. It was  
14 filed yesterday.

15 JUDGE HAIRSTON: But where is this argued in the brief? The brief  
16 is very brief and the reply brief is very brief. Where are the arguments made  
17 concerning the two insulator layers? I don't see those arguments.

18 MR. AKHAVANNIK: For example, I know that in particular the  
19 reply brief, on the second page -- well, starting on the first page, the final  
20 paragraph, talks about -- I apologize. Let's see here.

21 (Pause.)

22 MR. AKHAVANNIK: You want to see where the reply brief or the --

23 JUDGE HAIRSTON: You're making a very specific argument now  
24 concerning claim 45. Where is that argument in the brief and reply brief.

25 MR. AKHAVANNIK: The argument that the two insulating layers  
26 have different horizontal dimensions?



1 JUDGE HAIRSTON: Right.

2 MR. AKHAVANNIK: Starting on page four of the appeal brief, it  
3 talks about the processes that will be required to create different insulating  
4 films having different dimensions and why of those methods only one of  
5 them would have resulted in the two different dimensions and why it would  
6 not have been obvious to one of ordinary skill to use that fourth method.

7 JUDGE HAIRSTON: These are just hypotheticals.

8 MR. AKHAVANNIK: No. The processing used to create the  
9 semiconductor device in our application is laid out so that the first insulating  
10 layer has different dimensions, the second insulating layer.

11 These hypotheticals are used to discuss -- because of the lack of  
12 concrete analysis given by the Examiner on why the combination of  
13 Matsumoto into Yamazaki would not have been obvious.

14 What the Examiner does is discusses why an increased thickness of  
15 the insulating layer would provide some of the benefits of the matrix region  
16 in Matsumoto.

17 JUDGE HAIRSTON: Right.

18 MR. AKHAVANNIK: He doesn't discuss why one would have been  
19 motivated to have two different dimensions of an insulating layer and take  
20 only one of the insulating layers in Matsumoto and place it over top of the  
21 insulating layer three of the Yamazaki; and to do so, one of these four  
22 implementations would have had to have been used, and that's what we  
23 addressed in the appeal brief.

24 JUDGE HAIRSTON: Okay.

25 JUDGE EASTHOM: Just quickly. The first layer, insulating area in  
26 Yamazaki, you're saying that doesn't have sides aligned or it does?

1 MR. AKHAVANNIK: No, I'm not saying that.

2 JUDGE EASTHOM: Layer seven?

3 MR. AKHAVANNIK: It does have sides aligned with the  
4 semiconductor island; but again, Yamazaki only discusses one insulating  
5 layer and Matsumoto discusses two semiconductor layers having the same  
6 dimensions, horizontal dimensions. There is nothing in the art that would  
7 suggest to one of ordinary skill why you would only want to take one of  
8 those insulating layers.

9 JUDGE EASTHOM: Well, you're just trying to lay another layer over  
10 the top for more insulation. What's surprising about that?

11 MR. AKHAVANNIK: As discussed by the four methods, to do so  
12 and have the same structure recited in the claim, you would have to use only  
13 one of the two insulating layers provided by Matsumoto.

14 JUDGE EASTHOM: Right. The top one, for example.

15 MR. AKHAVANNIK: That's correct.

16 In our application, we describe that our insulating layer three has a  
17 thickest that's determined to be optimal, to minimize reflectivity of laser  
18 light.

19 JUDGE EASTHOM: Yours is?

20 MR. AKHAVANNIK: That's correct.

21 And so, to have a thin insulating layer and then have a thicker  
22 insulating layer Matsumoto put on top of it -- I don't see how that would  
23 have been predictable by someone reviewing these references.

24 JUDGE SAADAT: Well, multiple gate insulator or insulating layers  
25 is not uncommon, I mean for a variety of reasons, like maybe adhesion to  
26 the layer underneath, maybe for, as you said, reflective, maybe for --

1 JUDGE EASTHOM: Pin-hole covers.

2 JUDGE SAADAT: Yes. Pin-hole covers. Ease of processing. There  
3 are plenty of reasons that one would want to look at other options.

4 So, our concern is basically what exactly the claim requires with  
5 respect to dimension of these two layers.

6 MR. AKHAVANNIK: I agree with what you're saying. As shown in  
7 Matsumoto, multiple insulating layers have been used prior to our  
8 application date. However, having the two insulating layers, having the  
9 different dimensions is some- thing that we have done and I haven't seen in  
10 any of the art.

11 Now, going back to your point about the requirement in the claim for  
12 that to be so, having the final element in claim 45, for example, saying that,  
13 having one insulating film extends beyond another, I believe requires that  
14 you have two of at least different dimensions.

15 Matsumoto as described by the Examiner may suggest that you may  
16 want to have an additional thickness in a vertical dimension from the  
17 substrate but it doesn't have any discussion about horizontal dimension of  
18 the insulating layer which is what claim 45 has relative differences between.

19 JUDGE HAIRSTON: Okay. Is that it?

20 MR. AKHAVANNIK: Do you have any other questions for me?

21 JUDGE HAIRSTON: Any other questions?

22 JUDGE SAADAT: No.

23 JUDGE HAIRSTON: Okay.

24 JUDGE EASTHOM: I have none. Thank you.

25 JUDGE HAIRSTON: Thank you, counsel.

26 MR. AKHAVANNIK: Thank you.

1           (Whereupon, at approximately 10:10 a.m., the proceedings were  
2   concluded.)